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EXAMINER

BORSETTI, GREG

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/582,025	Applicant(s) VIRETTE ET AL.	
	Examiner GREG A. BORSETTI	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 29 is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Claims 1-29 are pending.
2. Claims 1-5, 11-13, and 22-27 have been amended.
3. Claims 28-29 have been added.
4. The objections to claims 1, 24-25, and 27 have been withdrawn.
5. The 35 USC 112 second paragraph rejections of claims 1, and 24-25 have been withdrawn. The 35 USC 112 second paragraph rejection of claim 27 is maintained.

Response to Arguments

6. Applicant argues "Furthermore, the coder disclosed in Gao runs only one encoder amongst the four encoders" (Remarks, Page 14, ¶ 6) The Examiner disagrees. The rate coding is based per frame, therefore per input signal, multiple coders are run. The argument is not persuasive.
7. Applicant further argues "Gao discloses a common parameter extraction, and a parameter analysis in order to select a unique rate encoder to be used. The parameter extraction and the parameter analysis do not consist in any way in a coding function, since coding is performed inside the rate encoders 36, 38, 40 and 42." (Remarks, Page 14, ¶ 8) The Examiner disagrees. There is an initial frame processing module 44 (column 10, lines 15-23) which is common to the coders. The initial frame processing contributes to the coding function in each of the rate encoders. The argument is not persuasive.

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8. Applicant further argues “Furthermore, with regard to the amended claims, Gao does not teach adapting parameters delivered by functional units of the coders, to the bit rates of the coders” (Remarks, Page 15, ¶ 1). In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., adapting parameters) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

9. Applicant further argues “Moreover, Gao et al. teaches parameter analysis so as to select a single encoder, whereas the present invention implements a multiple coding, which means that several coders are operated” (Remarks, Page 15, ¶ 2) In response to applicant's arguments, the recitation “multiple compression coding” has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

10. Applicant further argues “The coder disclosed in document Gao et al. is part of the prior art described in the present application (see pages 3-4 of the application). Indeed, document Gao et al. discloses a selection of coders "a priori"” (Remarks, Page 15, ¶ 3) In response to applicant's arguments against the references individually, one

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cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Gao was used in combination with Kolesnik to teach the limitation of an a posteriori selection. The Examiner notes that Claim 1 still fails to include an a posterior selection of the coders as it is argues in the Remarks. The argument is not persuasive.

Specification

11. The disclosure is objected to because of the following informalities: The term TDAC should be fully defined at least once in the specification.

Appropriate correction is required.

Claim Objections

12. Claim 13 is objected to because of the following informalities: Claim 13 depends from claim 12, which depends from claim 28. Claim 28 already recites the identifying, marking, and executing steps in now amended claim 13, therefore they are redundant and not necessary.

13. Claim 13 and 22-23 are objected to because of the following informalities: The claims recite an “a posteriori” selection module where the formatting of the font should be uniform (not in italics).

14. Claim 24 is objected to because the preamble is not clearly demarcated with a colon.

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15. Claim 25 is objected to because there are spurious double spacings between the words unit and are (calculations limitations), common and functional (...in case at... limitation), and the and rate (...in case at... limitation). The Examiner requests that the all claims be reviewed for similar mistakes.

16. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

17. Claims 1, and 24-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. This claim is an omnibus type claim. The last limitation of each of the independent claims does not clarify that the first and second coders operate at rates different from a common functional unit. It only states that if (or in the case that) the rates are different, the parameters are adapted to the different rates.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

18. Claim(s) 1-23, and 28 are rejected under 35 USC 101 for being nonstatutory.

Under the most recent interpretation of the Interim Guidelines regarding 35 U.S.C.101,

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a method claim must (1) be tied to another statutory class or (2) transform underlying subject matter to a different state or thing. If no transformation occurs, the claim(s) should positively recite the other statutory class to which it is tied to qualify as a statutory process under 35 U.S.C. 101. As for guidance to areas of statutory subject matter, see 35 U.S.C. 101 Interim Guidelines (with emphasis of the Clarification of "processes" under 35 USC 101); As an example, the claim(s) could identify the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed. As per independent claim 1, the claim may be interpreted as a human manually performing the calculations of performing two different coding operations on an input signal, the coding operations comprising functional units; calculating respective parameters for each coding operation, performing initial calculations for delivering a same set of parameters to functional units of the coding operations, and adapting the parameters if the initial parameters need to be rate adapted for the coding operations. Claims 2-23, and 28 fail to further tie the method to another statutory category of invention or provide a transformation.

19. Claims 1-23, and 28 are further rejected under 35 USC 101 because the claims are directed to a method which codes information, and as claimed, is a mathematical calculation (algorithm) where the claims do not produce a useful, tangible, and concrete result. If the acts of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter (Benson, 409 U.S. at 71-72, 175, USPQ at 676).

Furthermore, claims define nonstatutory processes if they simply manipulate abstract

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ideas (Warmerdam, 33 F.3d at 1360,31 USPQ2d at 1759). As for guidance to areas of statutory subject matter, see 35 U.S.C. 101 Interim Guidelines (with emphasis of the Clarification of Interim Guidelines For Examination of Patent Applications for Subject Matter Eligibility); as an example, in Alappat, the claimed output smooth waveform (consisted of lighting pixels on an oscilloscope/display) is a useful, concrete, tangible, final result; in Arrhythmia, the claimed useful, concrete, tangible, final result represented the condition of a patient's heart; in State Street, the claimed useful, concrete, tangible, final result was data output that represented a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades. Claims 2-23, and 28 fail to further define a statutory process.

20. Claims 25-26 are also rejected under 35 USC 101 for being nonstatutory.

Although independent claim 25 recites system type elements, these elements are disclosed in the specification (Page 7, Lines 10-22) as a software embodiment, and when treated as a whole, the claims are more toward a non-statutory embodiment and not necessarily a hardware embodiment. The Examiner notes that the inclusion of a "memory of a processor unit" will overcome this rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. Claims 1-2, 7-12, 15-16, 21-22, and 24-28 are rejected under 35 U.S.C. 103(a) as being taught by Gao et al. (US Patent #6581032) Kolesnik et al. (US Patent # 5729655 hereinafter Kolesnik).

As per claim 1, Gao teaches the multiple compression coding method comprising:

feeding an input signal in parallel to at least the first and second coder, each coder comprising a succession of functional units for compression coding of said signal by each of the first and second coders, the first and second coders respectively comprising at least a first and a second functional unit for performing common operations; (Gao, Fig. 2, columns 9-10, lines 64-67, 1-13, *...it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42...*)

calculating, by at least a part of the functional units, respective parameters for coding of the input signal by each coder; (Gao, column 10, lines 15-23, *...The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream...*, These quantization values (parameters) are required by each coder.)

performing calculations for delivering a same set of parameters to the first functional unit and to the second functional unit in a same step and in a same functional

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unit; and (Gao, column 10, lines 15-23, ...*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream...*, These quantization values (parameters) are performed in the initial-frame processing module which is its own module.)

Gao fails to specifically teach, but Kolesnik teaches:

if at least one of the first and the second coder operates at a rate that is different from a rate of a common functional unit, adapting the parameters to the respective rate of at least one respective said first coder and said second coder in order to be used by the at least one of said first and second functional unit respectively. (Kolesnik, column 8, lines 45-62, describes search mode selection involving ...*weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate...*, Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the

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additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 2, claim 1 is incorporated and Gao teaches:

wherein the common functional unit comprises at least one of the function units of one of the first and second coders. (Gao, column 10, lines 15-23, ... *The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream...* the initial frame-processing module performs the quantization instead of it having to be performed in each of the encoders, therefore the initial frame-processing module comprises at least one function unit of one of the coders.)

As per claim 7, claim 1 is incorporated and Gao fails to teach but Kolesnik teaches:

the functional units of the various coders are arranged in a trellis with a plurality of possible paths in the trellis, wherein each path in the trellis is defined by a combination of operating modes of the functional units and each functional unit feeds a plurality of possible variants of the next functional unit; (Kolesnik, column 14, lines 18-24, ... *The block diagram in FIG. 5 shows an implementation of a multi-mode trellis*

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encoding and linear prediction (MM-CELP) speech synthesizer. The synthesizer accepts compressed speech data as input and produces a synthesized speech signal. The structure of the synthesizer corresponds to that of the analyzer of FIG. 2, except that trellis encoding has been used... Kolesnik discloses the use of a trellis coding structure in which the analyzer of Fig. 2 also uses the trellis structure. The analyzer of Fig. 2 provides variable rate LSP encoder 202 (Fig. 4). Kolesnik thus teaches the use of a trellis structure for the coders where the trellis provides an interconnected structure connecting the various function units.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 8, claim 7 is incorporated and Gao fails to teach but Kolesnik teaches:

a partial selection module is provided after each coding step conducted by one or more functional units capable of selecting the results supplied by one or more of those functional units for subsequent coding steps; (Kolesnik, column 12, lines 25-28, ...FIG. 4 shows an implementation of the variable rate LSP encoder 202. The LSP

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encoder 202 uses m quantized LSPs and comprises three schemes for LSP predicting and preliminary coding... As shown in Fig. 4, there is a codeword selector (412) that teaches a partial selection module because it selects the results supplied by the function units of the variable rate encoders prior to the encoding (213) as shown in Fig. 2A where Fig. 2A highlights the variable rate LSP encoder (202) in general.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claims 9 and 10, claim 7 is incorporated and Gao fails to teach but Kolesnik teaches:

for a given functional unit, the path selected in the trellis is that passing through the lowest bit rate functional unit and the results obtained from said lowest (highest) bit rate functional unit are adapted to the bit rates of at least some of the other functional units by a focused parameter search for at least some of the other functional units up to the highest (lowest) bit rate functional unit. (Kolesnik, column 14, lines 18-24, as shown in claim 7 describes how a trellis structure is applied to Kolesnik in

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accordance with the instant application. Furthermore, it has been shown in claim 5 (Kolesnik, column 8, lines 18-25) and (Kolesnik, column 8, lines 45-62) that Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 11, claim 10 is incorporated and Gao fails to teach but Kolesnik teaches:

the functional unit operating at said given bit rate is used as the calculation module and at least some of the parameters specific to that functional unit are progressively adapted: up to the functional unit capable of operating at the lowest bit rate by focused searching; and up to the functional unit capable of operating at the highest bit rate by focused searching. (Kolesnik, column 8, lines 18-25,

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...Since different excitation search modes require differing numbers of bits for excitation coding, the bit rate value is variable from frame to frame. The largest number of bits is required by SACBS mode while the smallest ACB mode is required. To reduce, or to limit, the bit rate, without a substantial loss in speech quality, some restrictions on the search mode usage may be imposed optionally... Then, Kolesnik, column 8, lines 45-62 describes search mode selection involving *...weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate...* Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 12, claim 28 is incorporated and Gao teaches:

wherein said calculation module is independent of said coders and is adapted to redistribute results obtained in the executing step to all the coders. (Gao, column 10, lines 15-23, ...*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream...* The quantization information is passed along to all rate encoders.)

As per claim 15, claim 1 is incorporated and Gao fails to teach but Kolesnik teaches:

the coders in parallel are adapted to operate multimode coding and an a posteriori selection module is provided capable of selecting one of the coders. (Kolesnik, Fig. 2A , shows a parallel multi-mode coding scheme and the comparator and controller (210) is shown to select the mode.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

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As per claim 16, claim 15 is incorporated and Gao fails to teach but Kolesnik teaches:

a partial selection module is provided that is independent of the coders and able to select one or more coders after each coding step conducted by one or more functional units. (Kolesnik, column 5, lines 23-24, *...In one embodiment, a set of admissible modes is determined based upon the mode used in the previous subframe...* The comparator and controller (210) is independent of the coders and able to select the mode of the coders after the coding step of the previous frame is complete which teaches the after each coding step conducted by one or more functional units in the instant application.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 21, claim 1 is incorporated and Gao fails to teach but Kolesnik teaches:

the coders are of the analysis by synthesis type and the method includes steps common to all the coders including: preprocessing; (Kolesnik, column 5, lines 53-57, *...The digital speech signal, which is typically sampled at 8 KHz, is first*

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processed by a digital pre-filter 200. The purpose of such pre-filtering, coupled with the corresponding post-filtering, is to diminish specific synthetic speech noise... The preprocessing of filtering the synthetic speech noise is common to all the coders.)

linear prediction coefficient analysis; (Kolesnik, column 5, lines 10-13, ...*Compared to the Code Excited Linear Prediction (CELP) analyzer, one embodiment of the present invention reduces the number of bits needed for speech storing, or transmitting, without a significant loss in the subjective speech quality. These advantages are achieved by: using three different excitation search modes, instead of two modes employed in CELP, together with a special strategy of mode selection, and by using an efficient LPC coding... The LPC coding would inherently include LPC analysis.)*

weighted input signal calculation; and (Kolesnik, column 6, lines 41-43, ...*As in CELP, perceptual weighting is realized by passing the prefiltered speech signals through the weighting filter (WF)... The input signals are weighted in a filter to reduce speech noise lying in audible regions.)*

quantization for at least some of the parameters. (Kolesnik, column 5, lines 60-64, ...*Pre-filtered speech is analyzed by short-term prediction analyzer 201. Short-term prediction analyzer 201 includes a linear prediction analyzer, a converter from linear prediction coefficients (LPC) into line spectrum pairs (LSPs) and a quantizer of the LSPs... The line spectrum pairs are parameters and are quantized.)*

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the

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additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 22, claim 21 is incorporated and Gao fails to teach but Kolesnik teaches:

the coders in parallel are adapted to operate multimode coding and an a posteriori selection module is provided capable of selecting one of the coders; (Kolesnik, Fig. 2A , shows a parallel multi-mode coding scheme and the comparator and controller (210) is shown to select the mode.)

a partial selection module is provided that is independent of the coders and able to select one or more coders after each coding step conducted by one or more functional units; and (Kolesnik, column 12, lines 25-28, ...*FIG. 4 shows an implementation of the variable rate LSP encoder 202. The LSP encoder 202 uses m quantized LSPs and comprises three schemes for LSP predicting and preliminary coding...* As shown in Fig. 4, there is a codeword selector (412) that teaches a partial selection module because it selects the results supplied by the function units of the variable rate encoders prior to the encoding (213) as shown in Fig. 2A where Fig. 2A highlights the variable rate LSP encoder (202) in general.)

the partial selection module is used after a split vector quantization step for short-

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term parameters (Kolesnik, column 5, lines 60-67, ...*Pre-filtered speech is analyzed by short-term prediction analyzer 201. Short-term prediction analyzer 201 includes a linear prediction analyzer, a converter from linear prediction coefficients (LPC) into line spectrum pairs (LSPs) and a quantizer of the LSPs...* Kolesnik analyzes short-term parameters prior to the partial selection module as defined above. It would have been obvious to someone of ordinary skill in the art that split vector quantization could be used to analyze the short-term parameters because it is well known in the art. This can be seen in, Kolesnik, column 3, lines 12-16, which discloses "The most effective approaches of this type are split-vector quantization, disclosed in "Efficient Vector Quantization of LPC Parameters at 24 bits/frame," K. K. Paliwal and B. S. Atal, Proceedings of the 1991 IEEE International Conference on Acoustics, Speech and Signal Processing, pp. 661-664, May 1991..."

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 24, Gao teaches:

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at least a first coder and a second coder, the apparatus being fed with an input signal, said input signal being inputted in parallel to at least the first and second coders, (Gao, Fig. 2, columns 9-10, lines 64-67, 1-13, ...*it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42...*)

each of the first and second coders comprising a succession of functional units, for compression coding of the input signal by each of the first and second coders, (Gao, Fig. 2, columns 9-10, lines 64-67, 1-13, ...*it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42...* Each of the coders comprise operations for coding the input.)

at least a part of said functional units performing calculations for delivering respective parameters for the coding of the input signal by each coder, (Gao, column 10, lines 15-23, ...*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream...*, These quantization values (parameters) are required by each coder.)

the first and second coders respectively comprising at least a first and a second functional unit arranged for performing common operations, wherein (Gao, column 10, lines 15-23, ...*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized*

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parameters result in generation of a portion of the bitstream..., These quantization values (parameters) are required by each coder, therefore it would have been obvious to someone of ordinary skill in the art at the time of the invention that if the initial frame-processing module did not perform the quantization, each coder would have to individually perform the calculations.)

calculations for delivering a same set of parameters to the first functional unit and to the second functional unit are performed in a same step and in a same functional unit, and (Gao, column 10, lines 15-23, ...*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream...*, These quantization values (parameters) are performed in the initial-frame processing module which is its own module.)

Gao fails to specifically teach, but Kolesnik teaches:

in case at least one of the first and the second coder operates at a rate which is different from the rate of said common functional unit, the parameters are adapted to the rate of the respective at least one of the first and second coder in order to be used by the at least one of the respective first and second functional unit.

(Kolesnik, column 8, lines 45-62, describes search mode selection involving ...*weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate...*,

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Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

Claim 25 is rejected for the same reasons as claim 24 for having similar limitations. The additional limitation of a system is provided by Kolesnik claim 1 which teaches the method as being operable in a computer system, which is an apparatus for implementing the system.

As per claim 26, claim 25 is incorporated and Gao teaches or suggests:

identifying the functional units forming each coder and one or more functions implemented by each unit; (Gao does not explicitly teach the identification of

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functional units forming each coder. However, Gao, columns 9-10, lines 64-67, 1-13, ...*it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42...*, teaches that common processing is performed prior to the rate encoder and therefore the common functions would have inherently had to have been identified.)

marking functions that are common from one coder to another;
(Gao does not explicitly teach the marking of common functions, however columns 9-10, lines 64-67, 1-13, teach that common processing is done, therefore it would have been obvious to someone of ordinary skill in the art that the functions common to the coders would have been marked to later be able to compile their functions in the initial frame-processing module.)

executing said common functions only one time for the input signal for at least some of the coders in a common calculation module (Gao, column 10, lines 15-23, ...*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream...*, The quantization occurs once per frame for the input signal.)

As per claim 27, Gao teaches the method comprising:

feeding an input signal in parallel to an apparatus comprising a plurality of coders, each including a succession of functional units for compression coding of said

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signal by each coder, where each coder comprises a different combination of functional units (Gao, Fig. 2, columns 9-10, lines 64-67, 1-13, *...it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42...*)

identifying the functional units forming each coder and one or more functions implemented by each unit (Gao does not explicitly teach the identification of functional units forming each coder. However, Gao, columns 9-10, lines 64-67, 1-13, *...it should be noted that the initial frame-processing module 44 performs processing that is common to all the rate encoders 36, 38, 40, and 42 and particular processing that is particular to each rate encoder 36, 38, 40, and 42...*, teaches that common processing is performed prior to the rate encoder and therefore the common functions would have inherently had to have been identified.)

marking functions that are common from one coder to another; (Gao does not explicitly teach the marking of common functions, however columns 9-10, lines 64-67, 1-13, teach that common processing is done, therefore it would have been obvious to someone of ordinary skill in the art that the functions common to the coders would have been marked to later be able to compile their functions in the initial frame-processing module.)

selecting a function executed by a given coder amongst the functions that are equivalent, and executing said functions with parameters related to the given coder only one time for the input signal for at least some of the coders in a common calculation

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module (Gao, column 10, lines 15-23, ...*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame. The quantized parameters result in generation of a portion of the bitstream...*,

Quantization is typically performed by the encoder, therefore it is selected to be an equivalent functions across all the coders. Furthermore, column 10, lines 5-13, the initial frame-processing module 44 performs a rate identification and thus would know at least a parameter related to the rate coder for identifying which rate encoder to choose.)

producing and feeding a coded output signal from the apparatus based at least in part on the common functions. (Gao, Fig. 2, the encoder produces a coded output signal based on the initial frame-processing.)

Gao fails to specifically teach, but Kolesnik teaches:

adapting a result obtained from the execution of the function in the selecting and executing step for a use in at least a part of the plurality of coders; and (Kolesnik, column 8, lines 45-62, describes search mode selection involving ...*weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate...*, Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of

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different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

Claim 28 is rejected for the same reasons as claim 26.

22. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being taught by Gao et al. (US Patent #6581032) in view of Kolesnik et al. (US Patent # 5729655 hereinafter Kolesnik) in further view of Carter et al. (US Patent #5987506 hereinafter Carter)

As per claim 3, claim 2 is incorporated and Gao fails to teach but Kolesnik teaches:

for efficient coding verifying an optimum criterion between complexity and coding quality; (Kolesnik, column 7, lines 49-51, ...*To reduce the computational complexity of the search through the SCB, SCB analyzer 209 may be implemented as a trellis codebook...*, Furthermore, Kolesnik, column 5, lines 5-10, ...*Compared to the Code Excited Linear Prediction (CELP) analyzer, one embodiment of the present*

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invention reduces the number of bits needed for speech storing, or transmitting, without a significant loss in the subjective speech quality..., Kolesnik accounts for efficient coding to optimize the complexity and coding quality while reducing bit rate.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

Gao and Kolesnik fail to teach, but Carter teaches,

for each function executed in the executing step, at least one functional unit is used of a coder selected from said plurality of coders and the functional unit of said coder selected is adapted to deliver partial results to the other coders;

(Carter, column 18, lines 48-57, ...*As further depicted in by FIG. 5, each node 212a-212c connects via the shared memory subsystem 220 to a virtual shared memory 222. As will be explained in greater detail hereinafter, by providing the shared memory subsystem 220 that allows the node 212a-212c to access the virtual shared memory 222, the computer network 210 enables network nodes 212a-212c to communicate and share functionality using the same techniques employed by applications when*

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communicating between applications running on the same machine... The information is stored in shared memory and is available to all processes needing to access it. Thus, Carter provides the sharing of results between the coders of Kolesnik.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Carter with the Gao and Kolesnik device because "A further object of the invention is to provide computer network systems that have adaptable system configurations for dynamically exploiting distributed network resources and thereby increasing network performance and productivity (Carter, column 2, lines 58-62). Carter provides a system that improves performance by reducing redundancy where Gao also uses common processing where it would have been obvious to likewise reduce redundancy to reduce the required memory for the overall encoder by not performing the same calculations more than necessary.

As per claims 4 and 5, claim 3 is incorporated and Gao fails to teach but Kolesnik teaches:

the selected coder is the coder with the lowest (highest) bit rate and the results obtained after execution of the function in the executing step with parameters specific to the selected coder are adapted to the bit rates of at least some of the other coders by a focused parameter search for at least some of the other modes up to the coder with the highest (lowest) bit rate; (Kolesnik, column 8, lines 18-25, ...*Since different excitation search modes require differing numbers of bits for excitation coding, the bit rate value is variable from frame to frame. The largest number of bits is required by*

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SACBS mode while the smallest ACB mode is required. To reduce, or to limit, the bit rate, without a substantial loss in speech quality, some restrictions on the search mode usage may be imposed optionally... Then, Kolesnik, column 8, lines 45-62, describes search mode selection involving *...weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate...*, Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

As per claim 6, claim 4, is incorporated and Gao fails to teach but Kolesnik teaches:

the functional unit of a coder operating at a given bit rate is used as the calculation module for that bit rate and at least some of the parameters specific to that coder are progressively adapted: up to the coder with the highest bit rate by focused searching; and up to the coder with the lowest bit rate by focused searching.

(Kolesnik, column 8, lines 18-25, ...*Since different excitation search modes require differing numbers of bits for excitation coding, the bit rate value is variable from frame to frame. The largest number of bits is required by SACBS mode while the smallest ACB mode is required. To reduce, or to limit, the bit rate, without a substantial loss in speech quality, some restrictions on the search mode usage may be imposed optionally...*

Then, Kolesnik, column 8, lines 45-62, describes search mode selection involving ...*weighting coefficients effect the probability that a certain mode will be chosen for a given subframe. Through empirical study, the weighting coefficient of Table 2 have been found to provide subjectively good quality speech with a minimum average data rate...*, Kolesnik provides bit rate adjustment using the weighting coefficients which, in effect, provides an equivalent step in varying the bit rate based upon the searching mode that is chosen for the coder. It would have been obvious given the information in claim 3 that the weighting coefficients would be shared across chosen coders such that coders of different bit rates would be accounted for whether the initial rate was highest or lowest.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive

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codebook searching, pulse shaping, and low-complexity predictive coding for LPC's.

The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

23. Claims 14 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (US Patent #6581032) in view of Kolesnik et al. (US Patent # 5729655 hereinafter Kolesnik) and further in view of Jabri et al. (US Patent #6829579 hereinafter Jabri).

As per claim 14, claim 12 is incorporated and Gao teaches:

the independent module includes a functional unit for performing operations of a coding process; (Gao, column 10, lines 15-23, ...*The encoding by the initial frame-processing module 44 quantizes parameters of the speech signal 18 contained in a frame...*, there is a coding process performed by the initial frame-processing module 44.)

Gao fails to teach but Jabri teaches,

an adaptation transcoding functional unit. (Jabri, abstract, ...*A method for transcoding a CELP based compressed voice bitstream from source codec to destination codec. The method includes processing a source codec input CELP*

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bitstream to unpack at least one or more CELP parameters from the input CELP

bitstream and interpolating one or more of the plurality of unpacked CELP parameters

from a source codec format to a destination codec format if a difference of one or more

of a plurality of destination codec parameters including a frame size, a subframe size,

and/or sampling rate of the destination codec format and one or more of a plurality of

source codec parameters including a frame size, a subframe size, or sampling rate of

the source codec format exist..., Jabri provides a transcoding method between code

excited linear prediction (CELP) based compression schemes. It is well known in the art

that multi-mode coders can use different coders for different output means.)

Jabri and Gao are analogous art because both deal with coding and compression

of audio signals. It would have been obvious to someone of ordinary skill in the art at

the time of the invention to combine Jabri with the Gao device because "More

particularly, the invention provides a method and apparatus for converting CELP frames

from one CELP based standard to another CELP based standard, and/or within a single

standard but a different mode." (Jabri, column 2, lines 8-12) Since, multi-mode coders

are known to use multiple coders for optimization, It would have been obvious to

someone of ordinary skill in the art that they would need to be transcoded to a uniform

state to which they could be compared for the purposes of choosing the superior coding

method for the given input signal.

As per claim 23, claim 21 is incorporate and Gao fails to teach but Kolesnik teaches:

the coders in parallel are adapted to operate multimode coding and an a

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posteriori selection module is provided capable of selecting one of the coders;
(Kolesnik, Fig. 2A , shows a parallel multi-mode coding scheme and the comparator and controller (210) is shown to select the mode.)

a partial selection module is provided that is independent of the coders and able to select one or more coders after each coding step conducted by one or more functional units; and (Kolesnik, column 12, lines 25-28, ...*FIG. 4 shows an implementation of the variable rate LSP encoder 202. The LSP encoder 202 uses m quantized LSPs and comprises three schemes for LSP predicting and preliminary coding...*, As shown in Fig. 4, there is a codeword selector (412) that teaches a partial selection module because it selects the results supplied by the function units of the variable rate encoders prior to the encoding (213) as shown in Fig. 2A where Fig. 2A highlights the variable rate LSP encoder (202) in general.)

It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Kolesnik with the Gao device because Kolesnik provides the additional advantages of full adaptive codebook searching, shortened adaptive codebook searching, pulse shaping, and low-complexity predictive coding for LPC's. The combination would have been obvious because Gao provides a variable bit rate system that optimizes the bit rate based on the frame characteristics while Kolesnik could be applied to further optimize the bit rates of each of the coders by applying the methods described in (Kolesnik, column 3, lines 35-67).

Gao, Kolesnik fail to teach, but Jabri teaches:

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the partial selection module is used after a shared open loop long-term parameter search step. (Jabri, column 13, lines 50-58, ...*An open-loop pitch lag is estimated in every other subframe (except for the 5.15 and 4.75 kbit/s modes for which it is done once per frame) based on the perceptually weighted speech signal...* It would have been obvious that if the open-loop long term parameters are based on the perceptually weighted speech signal, that they would be performed prior to the partial selection module in Kolesnik because the weighting is done directly after pre-filtering.) Jabri and Kolesnik are analogous art because both deal with coding and compression of audio signals.)

Jabri, Gao, and Kolesnik are analogous art because both deal with coding and compression of audio signals. It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Jabri with the Gao and Kolesnik device because "More particularly, the invention provides a method and apparatus for converting CELP frames from one CELP based standard to another CELP based standard, and/or within a single standard but a different mode." (Jabri, column 2, lines 8-12) Since, multi-mode coders are known to use multiple coders for optimization, It would have been obvious to someone of ordinary skill in the art that they would need to be transcoded to a uniform state to which they could be compared for the purposes of choosing the superior coding method for the given input signal.

24. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (US Patent #6581032) in view of Kolesnik et al. (US Patent # 5729655

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hereinafter Kolesnik) further in view of Jabri et al. (US Patent #6829579 hereinafter Jabri). and further in view of Aguilar et al. (US Patent #7272556 hereinafter Aguilar).

As per claim 17, claim 1 is incorporated and Gao and Kolesnik fail to teach, but Jabri teaches:

the calculation module includes a bit assignment functional unit shared between all the coders, each bit assignment effected for one coder being followed by an adaptation to that coder, in particular as a function of its bit rate.

(Jabri, column 10, lines 21-22, ...*Subframe interpolation may be needed when subframes for different standards represent different time durations in the signal domain, or when a different sampling rate is used...* It would have been obvious to someone of ordinary skill in the art that if different bit rates are used for the coders, there would need to be an indication of the bit rate of the coder that would be common to all coders such that transcoding is possible.)

Jabri and Gao are analogous art because both deal with coding and compression of audio signals. It would have been obvious to someone of ordinary skill in the art at the time of the invention to combine Jabri with the Gao and Kolesnik device because "More particularly, the invention provides a method and apparatus for converting CELP frames from one CELP based standard to another CELP based standard, and/or within a single standard but a different mode." (Jabri, column 2, lines 8-12) Since, multi-mode coders are known to use multiple coders for optimization, It would have been obvious to someone of ordinary skill in the art that they would need to be transcoded to a uniform

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state to which they could be compared for the purposes of choosing the superior coding method for the given input signal.

Gao, Kolesnik, and Jabri fail to teach, but Aguilar teaches:

the coders are of the transform type. (Aguilar, column 4, lines 1-3,
... *Yet another object of the present invention is to provide a transform codec with multiple stages of increasing complexity and bit-rates...* Aguilar provides a transform coder in a multimode system.)

Aguilar, Jabri and Gao are analogous art because both pertain to compression coding for audio signals. It would have been obvious to someone of ordinary skill in the art to combine Aguilar with the Gao and Jabri device because Aguilar is an analogous invention which uses transform coders instead of CELP coders. Thus, it would have been obvious to switch the coders for either transform or CELP coders because they are functionally equivalent elements.

As per claim 18, claim 17 is incorporated and Gao teaches:

the method further includes a quantization step the results whereof are supplied to all the coders (Gao, column 10, lines 14-20)

As per claim 19, claim 18 is incorporated and Gao, Kolesnik and Jabri fail to teach, but Aguilar teaches:

it further includes steps common to all the coders including: a time-frequency

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transform; (Aguilar, column 8, lines 8-13, *...in accordance with the present invention, the band splitter 5 can be implemented as a filter bank, an FFT transform or wavelet transform computing device, or any other device that can split a signal into several signals representing different frequency bands...* An FFT transform is a time-frequency transform.)

detection of voicing in the input signal; (Aguilar, column 10, lines 57-65, *...In speech applications it is usually necessary to provide a measure of how voiced (i.e., how harmonic) the signal is at a given time, and a measure of its volume or its gain. In very low bit-rate applications in accordance with the present invention one can therefore only transmit a harmonic frequency, a voicing probability indicating the extent to which the spectrum is dominated by voice harmonics, a gain, and a set of parameters which correspond to the spectrum envelope of the signal...* Aguilar provides a measure of how voiced the signal at a given time is, which inherently means it would be detected.)

detection of tonality; (Aguilar, column 13, lines 60-64, *...The refined pitch estimate obtained in block 70 and the SEEVOC flat-top spectrum envelope are used to create in block 80 of the analyzer a smooth estimate of the spectral envelope using in a preferred embodiment cubic spline interpolation between peaks...* The pitch estimate would inherently be a detection of tonality because by estimating the pitch would determine a pitch amplitude which would be indicative of the tonality of the speech or audio input.)

determination of a masking curve; (Aguilar, column 19, lines 35-37,

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...In a preferred embodiment of the present invention, the masking envelope is computed as an attenuated LPC spectrum of the signal in the frame. This selection gives good results, since the LPC envelope is known to provide a good model of the peaks of the spectrum if the order of the modeling LPC filter is sufficiently high...The masking envelope teaches a masking curve for eliminating low side effects.)

spectral envelope coding; (Aguilar, column 10, lines 48-51, *...The next block in FIG. 3A shows that instead of transmitting the magnitudes of each sinusoid, one can only transmit information about the spectrum envelope of the signal... By transmitting the spectral envelope, it would inherently be coded.)*

Aguilar, Kolesnik, Jabri and Gao are analogous art because both pertain to compression coding for audio signals. It would have been obvious to someone of ordinary skill in the art to combine Aguilar with the Gao, Kolesnik and Jabri device because Aguilar is an analogous invention which uses transform coders instead of CELP coders. Thus, it would have been obvious to switch the coders for either transform or CELP coders because they are functionally equivalent elements.

As per claim 20, claim 17 is incorporated and Gao, Kolesnik, and Jabri fail to teach, but Aguilar teaches:

application of a bank of analysis filters; (Aguilar, column 8, lines 8-13, *...in accordance with the present invention, the band splitter 5 can be implemented as a filter bank, an FFT transform or wavelet transform computing device, or any other device that can split a signal into several signals representing different frequency*

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bands...)

determination of scaling factors; (Aguilar, column 10, lines 54-57, ...*As known in the art, the spectrum envelope can be encoded using different parameters, such as LPC coefficients, reflection coefficients (RC), and others... The coefficients are scaling factors.*)

spectral transform calculation; (Aguilar, column 17, lines 7-11, ...*In the following block 35, the magnitude and unwrapped phase envelopes are upsampled to 256 points using linear interpolation in a preferred embodiment. Alternatively, this could be done using the Discrete Cosine Transform (DCT) approach described in Section E.1...*)

determination of masking thresholds in accordance with a psycho-acoustic model; (Aguilar, column 19, lines 17-21, ...*Block 240 computes a masking envelope that provides a dynamic thresholding of the signal spectrum to facilitate the peak picking operation in the following block 250, and to eliminate certain low-level peaks, which are not associated with the harmonic structure of the signal... The harmonic structure teaches the psycho-acoustic model and thus the masking envelope creates thresholds in accordance with a psycho-acoustic model.*)

Aguilar, Kolesnik, Jabri and Gao are analogous art because both pertain to compression coding for audio signals. It would have been obvious to someone of ordinary skill in the art to combine Aguilar with the Gao, Kolesnik, Jabri device because Aguilar is an analogous invention which uses transform coders instead of CELP coders.

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Thus, it would have been obvious to switch the coders for either transform or CELP coders because they are functionally equivalent elements.

Allowable Subject Matter

25. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per claim 13, the closest known prior art Gao, Kolesnik, Carter, or Jabri fails to teach alone or in reasonable combination:

identifying the functional units forming each coder and one or more functions implemented by each unit;

marking functions that are common from one coder to another; and executing said common functions in a common calculation module

wherein the independent module and the functional unit or units of at least one of the coders are adapted to exchange results obtained in the executing step with each other and the calculation module is adapted to effect adaptation transcoding between functional units

Gao teaches a unit which processes common functions prior to the individual encoder processes. Kolesnik provides a multimode coding system. Carter provides shared memory spaces for redundancy reduction. Jabri provides a transcoding method between code excited linear prediction (CELP) based compression schemes. However,

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none of them teach that the coders and the common calculation module are adapted to exchange results obtained in an executing step and that the calculation module is adapted to effect adaptation transcoding between functional units of different encoders.

26. Claim 29 is deemed allowable over the prior art. The following is a statement of reasons for the indication of allowable subject matter:

As per claim 29, the closest known prior art Gao, Kolesnik, Carter, or Jabri fails to teach alone or in reasonable combination:

feeding an input signal in parallel to an apparatus comprising a plurality of coders, each including a succession of functional units for compression coding of said signal by each coder, wherein each coder comprises a different combination of functional units;

identifying the functional units forming each coder and one or more functions implemented by each unit;

marking functions that are common from one coder to another;

executing said common functions only one time for the input signal for at least some of the coders in a common calculation module; and

producing and feeding a coded output signal from the apparatus based at least in part on the common functions;

wherein

said calculation module is independent of said coders and is adapted to

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redistribute results obtained in the executing step to all the coders; and

the independent module and the functional unit or units of at least one of the coders are adapted to exchange results obtained in the executing step with each other and the calculation module is adapted to effect adaptation transcoding between functional units of different coders.

Gao teaches a unit which processes common functions prior to the individual encoder processes. Kolesnik provides a multimode coding system. Carter provides shared memory spaces for redundancy reduction. Jabri provides a transcoding method between code excited linear prediction (CELP) based compression schemes. However, none of them teach that the coders and the common calculation module are adapted to exchange results obtained in an executing step and that the calculation module is adapted to effect adaptation transcoding between functional units of different encoders.

Conclusion

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Refer to PTO-892, Notice of References Cited for a listing of analogous art.

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

29. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREG A. BORSETTI whose telephone number is (571)270-3885. The examiner can normally be reached on Monday - Thursday (8am - 5pm Eastern Time).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, RICHEMOND DORVIL can be reached on 571-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Greg A. Borsetti/
Examiner, Art Unit 2626

/Talivaldis Ivars Smits/
Primary Examiner, Art Unit 2626

7/14/2009